CABLE TELEVISION

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FACT OR FICTION???

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CABLE TELEVISION:

Hype or Real? Enquiring Minds Want To Know.

What is REALLY happening here???

Hardly a week goes by without some major newspaper devoting print space to the 'promise' of expanded television for New Zealand. During the last 6 months newspaper headlines have announced:

Cable TV Just Blarneyvision?
TV By Phone Line To Be Tested
Video-on-demand service under way
NZ May Get 49-channel TV this year
Community cable gets under way
Cable movie service irks video industry
Cable Tv in North moves closer with Telecom trial
Two-way TV key to fortune
Cable TV comes to Auckland

There is only one operating cable television system in New Zealand; at Paraparaumu. It serves approximately 300 subscribers. As Telecom's 'fibre optic pilot systems' come on line, they have the potential to serve 600 more New Zealand homes. SKY Network TV, an alternative to cable that has leap-frogged the time consuming and expensive laying of cable by purchasing UHF TV channels under the Management Rights scheme, now serves more than 107,000 New Zealand homes with three additional channels of 'pay television'.

The popular press including the newspapers would have readers believe the 'battle' between SKY's version of 'pay television' and cable's promise of multiple-channel television is a 'rugby scrum.' Even technically oriented news media such as Infotech Weekly (published by The Dominion) seem unable to separate cable's promise from sports page writing styles. Their September 13th issue headlined "*Cellular TV Fight Warms Up*" and in the opening sentence uses the word "*scrap*" to describe a 'battle' the reporter perceived between a totally experimental SHF (27-29 GHz) television delivery system, and, everyone else.

There is 'excitement' in the kind of cable service now in Paraparaumu. But it comes from doing proper engineering, informed planning, and then building a system which has some chance for economic success. A cable system is a practical alternative to the limited programming of off-air television, or SKY's high per-channel charges. For rural areas a basic cable service offers small town viewers the opportunity to participate in the same media services as their city-cousins. In many small, isolated New Zealand towns cable is likely to be the only way residents will ever have access to more than the three (national) networks. There should be no battle about this as we believe you will agree after studying this issue of Tech Bulletin.

TECH BULLETIN 9305-
CABLE TELEVISION IN NEW ZEALAND
(Part One of Two)

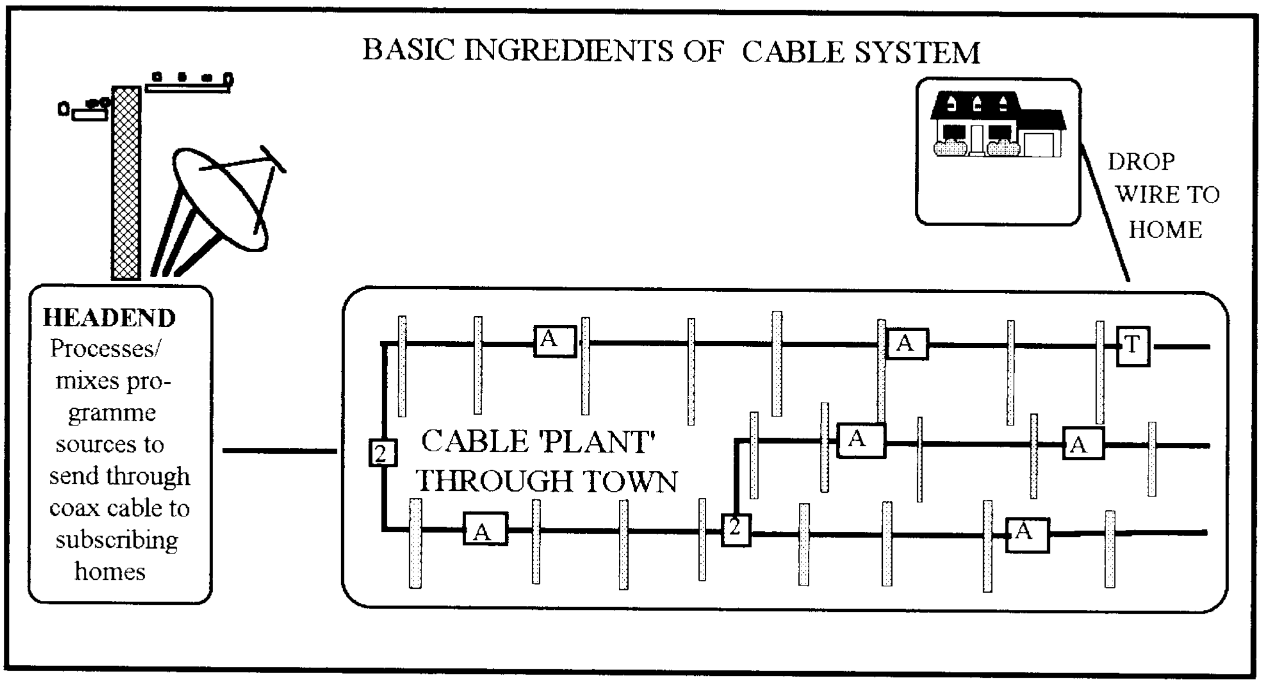
We'll begin by defining cable television. This is not an easy definition in New Zealand since we have been bombarded with images from Europe and North America showing 500 TV programme channels, interactive shopping, movies on order and channels as diverse as 24 hour sexually explicit material and 24 hour newscasts. At home, the only cable television system we have is located on the Kapiti coast north of Wellington and it is so recent in operation that the 'form' of cable here is not yet established.

First and foremost, cable television is a business. It may (by design or ineptness) be non-profit but it 'sells' a service for which it 'collects' money; indeed, it is a business.

Secondly, it may or may not be a business that 'sells' television programming. One of the legal hurdles faced in the early days of cable television in America was the question: "*Does cable sell TV programming*?" At the time this question was being pursued in the courts, cable created no programming of its own and acted solely as a 'relay' of television broadcast signals received by the cable system antennas. The courts took an interest in this question because broadcasters claimed cable was reselling their programmes without their permission, and, they were not being compensated for this. After years of lower court cases, the matter was finally settled in the US Supreme Court which ruled: "*Cable television does not sell programming; it is merely an extension of a viewer's antenna, and it does for the viewer what he could do for himself if he wished to spend the funds required to erect a sensitive receiving antenna.*" In other words, cable systems were not violating US copyright law and were not taking somebody's copyrighted broadcast material and reselling it without the permission of the owner. This landmark decision established the legal framework for the growth of cable in North America; a subject we shall return to for New Zealand.

So 'selling TV programmes' was a fork in the road; a cable system which functions strictly as "an extension of the viewer's antenna" is one branch; those that perform this function plus provide programming which originates, for a fee, in the cable firm's facility is another branch. We'll explore both.

Cable was first called '**community antenna television**' (the origins of CATV) since conceptually it consists of a high gain, master antenna 'shared' by those in the community wishing to avail themselves of its service. CATV as a phrase gradually lost out in favour of simply 'cable' or 'cable TV'. Until 1976, CATV existed almost exclusively by offering improved reception to people, communities or cities where direct home reception (DHR) was degraded by **(a)** surrounding terrain, **(b)** distance from the transmitters, **(c)** man-made obstacles and interference (from tall buildings, industrial equipment, etc.). Cable in America and Canada also capitalized on the appearance of UHF television since many of the early UHF broadcasters could not afford to operate with suitable power to make their signals comparable in quality to the more established VHF broadcasters; again, a similar situation to our present day (early) UHF telecasters. UHF television home receiving systems (antenna, lead-in cable, the TV set itself) were never as efficient as their VHF counterparts and the combination of lower transmission powers for UHF, and, the lower quality receiving conditions made it more difficult for the new UHF telecasters to gain audiences as large as their VHF competitors. Cable converted UHF channels to VHF channels/frequencies and to the cable home viewer the technical differences between a 'VHF channel' and a 'UHF channel' disappeared. Each was simply a 'dial position' on the TV set and each was judged first and last by its programme content, not first by its technical quality and then second by its programming. UHF broadcasters very much


BASIC INGREDIENTS OF CABLE SYSTEM

HEADEND
Processes/ mixes programme sources to send through coax cable to subscribing homes
CABLE 'PLANT' THROUGH TOWN
DROP WIRE TO HOME
A
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2

appreciated cable for this service. These functions are considered "an extension of the viewer's own antenna."

Beginning in 1976, satellite television (programme relay via microwave frequencies carried by satellite) became a new source of programming for cable in North America. At first only a single 12 hour per day film channel (HBO) was distributed via satellite and initial satellite equipment costs to receive this single channel were in excess of NZ$180,000. Within four years however more than a dozen separate TV programmers were using satellite to reach more than ten million US cable homes and the cost per channel for initial equipment had fallen to under NZ$6,000. Today, 17 years after satellite service began, US cable operators have access to 110+ separate full-time (24 hour per day) satellite distributed programming sources at an initial cost for equipment of less than NZ$3,000 per channel. Similar growth has occurred in Europe (1985 to present), and as you read this Asia (from the Middle East to the Russian peninsula including China) is experiencing a boom period with similar growth underway. During the period 1982-1990 a similar boom swept through South America and portions of Africa are very promising to cable entrepreneurs. Does satellite programming cause the cable system to be in the 'pay programming' branch? It can. If the cable programming is offered to the public at large (i.e., anyone with a home satellite antenna system can see it themselves), the answer is no; it remains in the "extension of the viewer's own antenna" category. If the programming is available exclusively through a cable operator, then the cable system has 'crossed the line'.

Satellite programme relay has totally revolutionized the cable TV business; it is now as easy to 'plug-in' into a program source originating half-a-world away as it is to connect cable subscribers to the local TV1 transmitter 20 km distant.

I WON'T PAY FOR TELEVISION!

(or, I already pay my broadcast license fee...)

Many New Zealanders, especially those who live in areas where only TVs 1 and 2 are available (and often with poor quality reception at that), would like to believe that having paid their annual $110 fee for their broadcast license, they are 'entitled to receive all of the television there is, without additional cost'.

Canada, the UK, Holland and Sweden (the list is quite long) also collect annual 'broadcast fees' from viewers. Canada has 79% of its homes connected to cable; Holland 91% of all homes connected to cable (and on and on). The annual 'broadcast license fee' paid by a Canadian, or a Dutchman, is comparable to our annual New Zealand fee. Additionally, the 'typical' Canadian cable home also pays NZ$52.20 per month for an average of 38 cable delivered channels. The 'typical' Dutch home currently pays NZ$47.40 per month for an average of 26 cable delivered channels.

The world experience is uniform, even in Russia, where cable connected residents pay a monthly fee for cable reception (6 channels, on average, NZ$2.16 per month but do not be misguided by this unusual number as the Russian economy at the moment is quite unstable).

Yet the Russian example is on-point since even this minuscule fee is an important portion of the Russian cable home wage earner's monthly income; on the order of 7% of his or her monthly earnings. A study in the 1970s looked at 'value for dollar' as perceived by people living in an area of the State of West Virginia which had been wracked by 4 years of labour disputes between coal miners and coal companies. People in this region had been reduced in the thousands to bare subsidence, living by their wits and on meager federal and state unemployment benefits. Faced with economic hardtimes, the study found more than 91% of those homes with cable TV available to them elected to retain their cable even when faced with giving up their telephone, or buying fuel for their cars or trucks as an alternative to keeping cable. When all of the hand wringing was over, cable stood out as an 'information/entertainment/educational' bargain to these disadvantaged people; even more than their telephone or the continued use of their vehicle.

For most of the world, cable is an optional (albeit very desirable) extra. Without it there is still television; with it, there is more television, or more precisely, a much broader and more diverse selection of programming.

Perhaps it comes down to costs per day, per hour of TV watched; however you wish to divide the dollars spent. The annual New Zealand license fee at $110 per household comes down to 30 cents per day. More than 88% of eligible Kiwi homes pay this fee.

SKY TV averages $1.33 per day. Kapiti's Kiwi Cable TV averages 67 cents per day. Renting a single movie at the rental shoppe to play on your home VCR averages $4.

However, after paying the broadcast license fee, TVs 1, 2, and 3 are free; right? Not quite. With an annual revenue take in excess of $400 million, TVs 1, 2 and 3 are funded by advertising sales. Every product advertised on TV includes the cost of its advertising in its own retail pricing; a new Ford Laser, for example, may have a $300 advertising 'allowance' built into its retail price. Advertising costs, like bolts and steel and tires, are a part of the 'fabric' of the car's cost.

If TVs 1, 2 and 3 take in $400 million this year in advertising, then that $400 million appears again as increased costs for every product advertised on TV. The consumer pays for this advertising cost each time a product is purchased. At $400 million revenue for the TV networks, with 1.1 million Kiwi homes the average home is paying $363.64 each year for TV advertising. You may not purchase a new Ford Laser this year, but many do purchase Lottery tickets, they do purchase appliances, shop at food chains advertising on television, do buy CDs or chocolates advertised on television. In each product purchased is a percentage of the cost allocated to advertising.

AT $363.64 per Kiwi home per year, it comes to 99.6 cents per day ... per home ... 365 days per year even without watching TV!

By any system of measurement, television viewing is hardly a '**free** service' available equally to every Kiwi home.

ARGUMENTS AGAINST CABLE

Those who oppose the introduction of cable have pretty stock arguments, worldwide. Here is a small collection of these anti-cable arguments for you to consider.

#1) Cable programming is alot of mindless babble.

Cable programming starts by including all normally available television (i.e., TV1, TV2, TV3) and expands from there. The areas of expansion include specialized 'vertical interest' programming for groups such as women (Lifetime), children (Nickelodeon), sports enthusiasts (ESPN), news buffs (CNN), business people (CNBC), or religious groups (Trinity Broadcasting). Then are added specialized programming categories less respectful of gender or age; all movie channels (HBO started this way), all cartoon channels, all science-fiction channels, all gardening channels, all cooking channels and so on. Then, because satellite interconnection is worldwide, 'home-country-language' channels are distributed; China's national TV service, Japan's national TV service, Italy's national TV service and so on are available.

The basic concept with cable is to utilise its considerable channel-bandwidth-capacity to include at least one channel of very special interest to virtually every potential viewer. It is doubtful that a native Kiwi would find much of interest in the Japanese national service; conversely, a Kiwi of Chinese ancestry would find much of interest in the Chinese national TV service.

Not every channel is supposed to appeal to every viewer; no more than every book in your local library, nor every magazine at the corner newsstand is of interest to every person. Cable is about diversity and selection, not an overwhelming barrage of first run broad appeal programming. When you appreciate what cable is supposed to be, and not what it is not (100 channels of the caliber of BBC might be nice; worldwide such 'quality' television may exist on a total of ten channels and not all of it will be in English) ... then your expectations for cable are properly placed.

#2) Cable TV is expensive.

If each home is already paying $0.30 per day for its license fee, and on average $0.996 cents per day for 'advertising costs', we have a national plateau of $1.30 each day. Most viewers can identify the first 30 cents; few are conscious of the next $1.00 (a number that is going up annually as the TV networks sell more and more advertising time each year).

In the next plateau we have three frames of reference in New Zealand:

a) SKY which charges you $1.33 per day for three channels,

b) Kapiti's Kiwi Cable TV charging $0.67 per day for 12 channels, and,

c) The local video rental store that charges you $4 for a movie that averages less than two hours in play time.

As New Zealand's only 'real' cable system, Kiwi Cable is obviously the least expensive option of the three presently available. Some comparisons are in order.

CANADA - $1.38 per channel per month
KIWI CABLE - $1.67 per channel per month
HOLLAND - $1.82 per channel per month
SKY TV - $13.33 per channel per month
VIDEO STORE - $1,440 (!) per channel per month

What follows is a 'trust us'; the Holland and Canada examples are not selected to make any type of point here. US, UK, and other examples (other than Russia) would fall in the same range.

Expensive? Certainly renting 2 hour video tapes 24 hours per day 30 days a month would be expensive. That's one of the advantages to SKY's movie channel of course; for $13.33 per month you have the equivalent of $1,440 in tapes to watch each month; less than 1% of the rental store cost.

Is cable itself expensive? Not when compared to the presently available alternatives.

#3) Cable TV is an intrusion in my home.

This one may have its origins in Australia where, in the mid 1970s, the government 'warned citizens' that if they allowed cable into their home, the cable could 'spy' on them. In thirty-five years of covering the development of cable, we have never heard this argument floated outside of Australia as it was in the 70s.

Cable TV entering the home consists of a piece of copper-based coaxial cable. Any piece of cable can be designed to send information in two directions; out of home/in, or in home/out. The telephone wires do this; the power wires could do this. Even with a two-way cable system (one that allows home subscribers to communicate cable programme orders with the cable company directly) the equipment necessary for 'spying' is not in place. A telephone, on the other hand, retrofitted with an under $10 module can transmit every sound in the home to outside the home 24 hours per day. Or, for under $25 a tiny 'FM bug' wireless microphone 'planted' in the home can do the same thing without any wires. And those homes that have a 'wireless Baby Minder' installed next to the baby's crib ... would probably be distressed to know that every voice/sound in the home can be clearly heard on a VHF FM radio purchased from Dick Smith at distances of 5 kilometres.

Cable TV as a 'spying instrument' is a non issue; except perhaps in Australia where raising it as an issue helps divert attention from cable TV as a desirable service.

SO WHAT IS A CABLE TV SYSTEM?

Cable TV was first defined in New Zealand by the **Telecommunications Act of 1987**. This act was affected on 10 December 1988 (Telecommunications Amendment Act 1988), again on 27 May 1989 (**Broadcasting Act 1989**), again on 28 March 1990 (Telecommunications Amendment Act 1990), and yet again on 28 August 1990 (Broadcasting Amendment Act No. 2 1990). Prior to the 1987 act, it was not technically possible to operate a cable television system in New Zealand as regulations in place only allowed utility companies (such as Telecom) to install cables which crossed over or under public roads. Lacking the ability to run cables from place to place, there was no method for cable TV to function.

Phil Callaghan (Callaghan Communications, P.O. Box 100-735, North Shore Mail Centre, Auckland; 09-444-0553) remembers those days. Installing 'master antenna' (cable) systems for sub-developers and large housing developments, Callaghan had initiated systems which would one day grow to more than 400 'housing units' connected to a single antenna system; a (cable) system which even today is larger in terms of homes-served than either Kapiti's Kiwi Cable or Telecom's Pakuranga/New Lynn installations.

"I won the contract for the system, but because the subdivision had streets and roads to be crossed, I was forced by law to 'deed' the system to the telephone company; they were the only ones with the legal rights to cross streets." Callaghan had the right technology but he was in the wrong place at the wrong time.

The laws (Telecommunications Act, Broadcasting Act as amended) state that today you have the right to run cables along side of (whether overhead or under ground) or across (again whether below or above) 'road reserves'. Seemingly, the way is now clear for cable TV to develop in New Zealand. We'll return to this 'good news' statement, later, with the 'bad news'.

Recall that a cable system is a business. Let's reduce that to its lowest economic denominator. We'll need some numbers for illustration.

1) We'll assume a 'community' with 500 homes; only slightly larger that Callaghan's largest 'master antenna' system.

2) We'll also assume for business planning purposes that within 3 years of starting our cable TV system in this community, 50% (250 homes) will have subscribed.

3) After some careful planning, we have calculated this cable system will cost us $175,000 to install. Note this will place the cable distribution lines on all streets in the community so that any one of the 500 housing units can be 'hooked up' to the cable if they desire the service.

4) As a 'paper-test' we decide to charge $20 per month, like Kiwi Cable, and collect $50 for the 'initial hookup'.

Now the economic exercise. If we build this cable system, we'll have $175,000 invested which eventually has to come back. And, before we get it back (as 'profits'), we have to operate and maintain the system. How long might it take to do this?

A proper 'economic cash flow' in this situation would be pages in length with thousands of individual numbers being crunched. At this stage we are merely illustrating the way a cable system generates 'cash' (called cash-flow in the cable business) and what follows will provide a 90% accurate 'first approximation' of the economic viability of the cable system in question.

In the revenue stream we have **(a)** initial hookup fees (paid one time, at the time of connecting a home to the cable), and, **(b)** monthly subscription income (paid every month after the home subscribes). In the expense stream we have items such as personnel, maintenance, replacement parts, electricity and telephone, possible charges for programming (we'll explain), office and antenna site rental, interest on our original invested sum, outside accounting and professional services and the cost of renting space on power utility poles for our cables.

Our objective is to determine whether this particular example cable system is 'doable'; i.e., can it pay for itself in a reasonable period of time, and how long before it can support not only itself but the owner as well.

If in our assumption it will take 3 years (36 months) for 50% of the homes (250 total) to subscribe, then it will only be the 36th month where our gross income will be 250 (homes) 'x' $20 or $5,000. For each month preceding the 36th, the income will be incrementally less. It happens that cable systems, unless they have massive, uncorrectable technical problems, tend to grow a little bit each month. So each month you have a few more subscribers 'on line' and therefore correspondingly more income.

A safe number for the first month is 10% of the homes will subscribe. This assumes only that the cable TV channel offering is sufficient that nobody given the opportunity to subscribe feels like they can do 'as well' with their rooftop aerial. So this gives us a starting plateau for month 1; 10% (50 homes). Between month 1 and the end of month 36, we grow a few each month from 10% (50 homes) to 50% (250 homes). As each home signs-on, they pay the $50 connection fee and for the hook-on month and for each month that follows they pay $20. How many dollars are generated in 36 months?

A table here (right) illustrates.

Between month 1 and 36 the example cable system grows from 50 to 250 subscribers; monthly gross income grows from a low of $1,700 (month 2) to a high of $5,250 (month 36). The system continues to 'mature' (add subscribers) through the point where it reaches a 75% 'penetration' (i.e., serving 3 out of every 4 homes in the community); in month 75. At that point, for our study at least, it stays at the same level through the end of year ten (month 120).

Along the way it collects money for its service; $29,600 in year one, rising to $56,400 in year 3, to $90,240 in year 7 (a level it maintains to the end of our ten year study

MONTH	NEW HOMES	HOOK-UP SS	SUBS/$20	SUB INCOME	TOTAL INC.	% HOOK-UPS
1	50	$2,500	50	$1,000	$3,500	10%
2	10	500	60	1,200	1,700	12
3	10	500	70	1,400	1,900	14
4	10	500	80	1,600	2,100	16
5	10	500	90	1,800	2,300	18
6	10	500	100	2,000	2,500	20
7	5	250	105	2,100	2,350	21
8	5	250	110	2,200	2,450	22
9	5	250	115	2,300	2,550	23
10	5	250	120	2,400	2,650	24
11	5	250	125	2,500	2,750	25
12	5	250	130	2,600	2,850	26
13	5	250	135	2,700	2,950	27
14	5	250	140	2,800	3,050	28
15	5	250	145	2,900	3,150	29
16	5	250	150	3,000	3,250	30
17	5	250	155	3,100	3,350	31
18	5	250	160	3,200	3,450	32
19	5	250	165	3,300	3,550	33
20	5	250	170	3,400	3,650	34
21	5	250	175	3,500	3,750	35
22	5	250	180	3,600	3,850	36
GROWTH CONTINUES AT SAME RATE TO MONTH 36 AS SHOWN BELOW						
36	5	250	250	5,000	5,250	50

REVENUE STREAM / EXAMPLE 500 POTENTIAL CABLE TV SYSTEM

period). In ten years, the cable system has taken in $724,410.

Now, 500 homes (a community of approximately 1,600 people) is hardly a large community. The tables here can be expanded to say 5,000 homes (a community of 16,000; Taupo as an example) or divided further to say 50 homes for a 'quick estimate' that will be at least 80% accurate.

Recall that we started out with an investment of $175,000. We also listed a set of operating expenses. If the operating expenses were 'zero' (not realistic), then in ten years with a gross income of $724,410 and an initial investment of $175,000, we've had a ten year 'profit' of $549,410. At $54,941 'per year' this would be quite a business!

ANNUAL OPERATING COSTS / EXAMPLE 500 POTENTIAL CABLE TV SYSTEM

	p/MO	YR. 1	YR. 2	YR. 3	YR. 4	YR. 5	YR. 6	YR. 7	YR. 8	YR. 9	YR. 10
Staff	$500	$6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
Mainten.	$365	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400
Elec/Tel	$150	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800
Prgmng	$4p/sub	4,300	7,680	10,560	13,344	15,552	16,944	17,952	18,000	18,000	18,000
Off Rent	$100	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
HE Rent	$100	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
Acct/Lgl	$100	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
Pole Rnt	$195.83	2,350	2,350	2,350	2,350	2,350	2,350	2,350	2,350	2,350	2,350
Veh Ops	$250	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
Matrls	$30*	3,600	1,680	1,680	1,596	784	756	224	-0-	-0-	-0-
TOTAL		**$29,050**	**$30,510**	**$33,390**	**$36,090**	**$37,486**	**$38,850**	**$39,326**	**$39,150**	**$39,150**	**$39,150**

Nomenclature: Mainten(ance) includes replacement, spare parts. Pr(o)g(ra)m(mi)ng is cost of programming from satellite/tape at $4 per home per month; see text. 'HE' rent/headend site rent. Pole rent/$10 per pole, 235 poles. Mat(e)r(ia)ls is drop materials to hookup individual homes as they subscribe ($30 per home).

Alas, it will cost money to operate this business and we now must make some educated estimates as to how much it will cost to operate.

A table here illustrates.

What the table tells us is that there are at least two ways to build and operate our 'example' cable system. It could be a stand alone business, responsible for its own vehicle(s), office space, and personnel. Or, it could be combined with another (already existing) business; a TV service shoppe, an electronics dealership, a Four Square store. It really doesn't make a great deal of difference what type of business it combines with as long as the business owner is willing to share the premises for both businesses.

This is an option which becomes more and more important as the size of the community shrinks. It is doubtful a 'stand-alone' cable business could function in a community of 500 potential homes; a town of 5,000 homes, on the other hand, can afford the additional overhead of a dedicated cable company office, its own staff, its own service vehicle and so on. For this reason, all over the world, most of the 'smaller' cable systems (1,000 cable subscriber homes and down) are called 'Mom and Pop' cable systems; they are run as extensions of another hometown business and the 'staff' seldom includes a full time person just for cable. There are important savings here especially in the personnel and facility area.

$175,000 initial cost? How do we arrive at that number? In part-two of this series we will look closely at the nuts and bolts of the cable system to help you understand what parts are required, how they interface with other parts, and what our options are for each category of part. For our example system we are making a number of assumptions; shown here in summary form (next page).

A cable system consists of two primary cost-areas:

1) The headend, a name given to the location where we first receive off-air signals (TVs 1, 2, 3, TAB and an independent channel

CABLE HEADEND COSTS

Headend costs are typically based upon total-cost per cable channel delivered to the home. In our example system there is a budget of $5,915 for the tower/off-air antennas, $8,190 for five off-air signal processors, $10,192 for 6 CATV grade modulators, $5,096 for 4m satellite dish, $5,100 for 4 satellite receivers, $2,730 for 3 VHS playback decks, $13,650 for 5 NTSC/PAL standards converters, $1,100 for local automated text channel memory, and $4,550 for a headend site building to house the equipment. This comes to approximately $56,000 or $4,666 per channel; **$112** per potential subscriber home (with 500 homes).

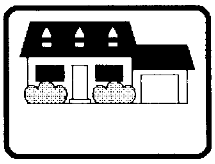
CABLE PLANT CONSTRUCTION COSTS

Above ground construction requires cable to pole attachment/support hardware and pole-line working equipment. Cable is supported between poles with 'messenger strand' of steel wire. Buried construction requires 'pedestals' to place equipment, make splices and underground trenching/boring equipment. Coaxial cable and electronics differs only slightly whether system is buried or 'aerial'. Labour costs for buried plant vary with difficulty of trenching/boring but will average several dollars more 'per metre' installed.

Our example system here assumes 25% buried, 75% aerial at an averaged installed cost of $7,335 per kilometre. This includes all hardware, electronics, cable and powering equipment. On the basis of 500 potential homes, this comes to **$236.18** invested per potential subscriber home. See 'house connect' below.

HOUSE CONNECT

Cable, hardware,connectors, possible cable converter.
$30 typical/less converter



in our assumed example), our satellite service channels (4 are assumed and this will be explained), our (video) taped channels (two are assumed) and our automated local information/bulletin board/weather data channel. That's 12 channels of TV in all.

Because of the need to produce high quality off-air signals from the New Zealand broadcast channels carried, the 'headend site' is typically at an elevated location (hilltop) close to but seldom right in the community being served. In the absence of hills nearby, a suitable (30-40 metre) tower is erected for this purpose.

2) The cable plant proper. This is the coaxial cable network which originates at the headend and through a system of interconnected coaxial style cables distributes the TV channels throughout the community. The cable alone is not enough; 'line amplifiers' re-boost the signal at intervals, line splitters allow one line to branch out into multiple streets, customer 'tap-off' devices interface individual homes to the cable plant, and power supplies inject 30 or 60vac into the coaxial cable to 'line power' the amplifiers.

The cable plant can be suspended on existing (power) utility poles (regulations exist which prescribe the safety clearances between the top-of-pole power wires and the lower coaxial cable wires), buried underground or a combination of the two. If utility poles are used there is a negotiated rental fee per-pole, per-year.

The headend determines how many channels of TV programming will be available, and from which sources. Whether the cable system serves 500 homes or 5,000, the headend design remains quite similar. It is not impacted by the number of homes served, only by the number of programming sources you feel you must offer subscribers to have a viable business. As a business planning exercise, you can take the total cost of the headend and divide by the number of subscribers to determine that portion's per-home cost. In our example, we project $56,420 for the headend to serve 500 potential customers; $112.84 per home. The same headend in a community of 5,000 potential homes would cost $11.28 per home.

The cable plant is length cost conscious. Few communities have defined 'edge of town' boundaries and the cable operator has to decide at what point he initially 'stops building cable'; how far do you go 'into the countryside' to reach more homes. This is measured as so-many homes-per-kilometre. In most cases it will cost about the same dollars per kilometre of installed cable plant whether the cable is passing 100 homes or 10 homes. You will have more subscribers in the kilometre that passes 100 homes than in the kilometre passing 10 homes. At what home-count per-kilometre do you no longer find the cable investment worthwhile?

There are many cost factors involved in answering this question, including:

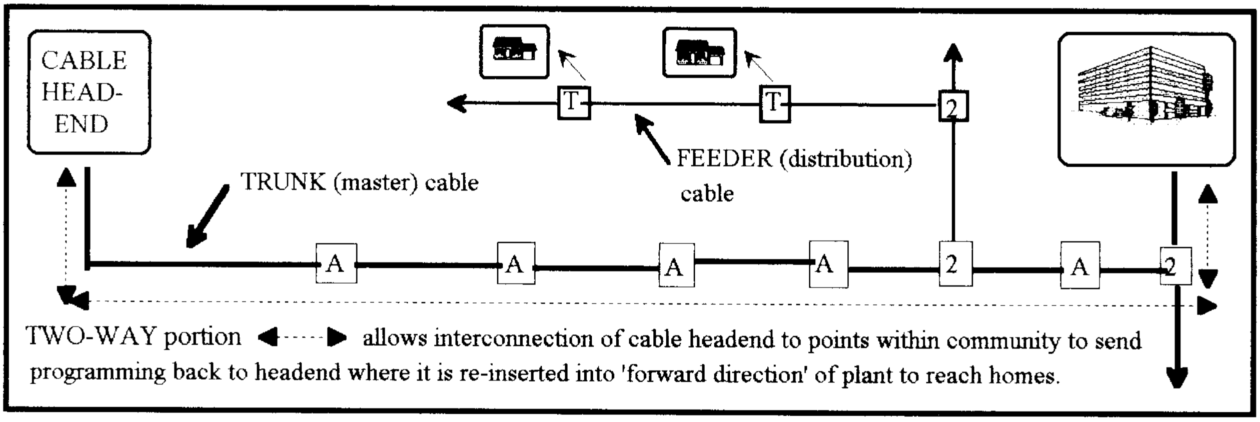
a) Is the cable going in overhead (on poles), or underground (buried)?

b) What will the bandwidth of the system be? Greater bandwidth costs more money per incremental length of cable plant.

c) Will the system be, or make provision for later addition of, two-way? There is a slight incremental cost increase if the plant is designed from the outset to be later expanded to two-way; there is a sizable increase in cost if the plant will be two-way functional from the outset.

In our modeled system, here, we have allowed for 31 homes per kilometre at $7,335 installed price per kilometre ($7.34 per metre). The total system length is 16.1 kilometres coming to $118,088 for cabling the town with a CATV plant. These numbers reflect the 'real world' for a cable plant that might be installed in a typical New Zealand town of from 1,000 to perhaps 7,500 population with 75% of the cable lines overhead and 25% buried. A higher percentage of buried plant will increase the cost per kilometre quite dramatically by as much as $3 per metre buried additional. Making the plant two-way expandable will add $.25 per metre while building the plant to be two-way capable will add $1.10 per metre.

Many CATV plants are two-way capable only on the 'trunk' (main or primary distribution) lines. Kapiti's Kiwi Cable uses this 'return band' (two-way capability) to send live coverage of the local council meetings from the council chambers back to the cable headend. This provides a way for the cable company to televise local events without going to others (such as Telecom) for bandwidth facilities to link the headend with the council chambers. If you know from the outset the locations in town where you might wish to 'originate' TV coverage, you can plan/design the cable system from the outset to have the capability. We diagram that here.



TWO-WAY portion ◀----▶ allows interconnection of cable headend to points within community to send programming back to headend where it is re-inserted into 'forward direction' of plant to reach homes.

THE PROGRAMMING?

Cable systems live and die by their access to programming. If we make the assumption that any town where cable is a possible business activity already will have access to TVs 1, 2 and 3 then we must offer the potential subscribers something significantly more diverse than these three channels to be a viable business.

(NOTE: If your potential town has no TV3, but it could be made available on cable, and/or degraded reception on 1, 2 and 3, which could be 'perfect on cable', that's a 'plus' for the cable system's chances of economic success.)

In the context of 'available programming sources', fast forward ahead now to the spring of 1994. As reported to **Coop's Technology Digest** for 20 November (1), by November of 1994 New Zealand's access to European/North American cable television programming networks will have multiplied many-fold. Based upon the launch of four new Pacific Ocean Region satellites during the next 12 months, there will be an 300% increase in available satellite service channels in the next twelve months. Unlike the presently available satellites, the new ones will be **(a)** 'high' power (allowing cable dishes of 4 metres and down), and, **(b)** stable in orbit (eliminating the need to 'track them'). It is not possible, today, to state specifically which programme sources will be available to New Zealand; it is possible to predict that by late 1994/early 1995 for the first time New Zealand will have real-time access to at least some of the same cable programming sources as now used by European/North American/Asian cable firms.

We illustrate our 'model system' channel lineup here. It includes the three terrestrial national networks, TAB, an independent (i.e., Horizons Pacific or other regional telecaster), four satellite-delivered cable networks, two tape-delivered cable networks and local bulletin board/automated text channel that also includes automated local weather information. This is a total of 12 cable channels which means the potential subscriber will have 4-times as much programming on cable as they have from their rooftop antenna. Experience worldwide tells us this level of cable-advantage will allow the cable operator to meet the economic projections depicted earlier here with a comfortable margin of safety.

EXAMPLE SYSTEM/CHANNEL LINEUP

CABLE CH.	SERVICE
1	TVNZ/ TV-1
2	TVNZ/ TV-2
3	TV3 Network
4	TAB and channel leasee
5	UHF Independent
6	Cable/Local Automated Services
7	CMTV/Country Music (tape)
8	MuchMusic (tape)
9	Movie Service (satellite)
10	Sports Service (satellite)
11	CNN/news service (satellite)
12	Children's Service (satellite)

(Some subscribers will have in-house converter)

THE PROCESS

Based upon the Telecommunication and broadcasting acts cited at the opening of this report, here are the rules governing starting a cable television system.

1) If your cable system will serve 500 or fewer people (not homes; equivalent to approximately 157 homes), there are no rules. None. You could begin a cable system tomorrow without as much as a single 'permit'.

2) If your cable system will serve more than 500 persons, you may optionally file an application with the Ministry of Commerce to obtain a designation known as 'Network Operator'. This is not mandatory; it is optional.

As a practical matter, a cable system must have a way to extend its cable through a community. The telephone company has legal rights to do so; so does the electrical utility.

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(1)/CTD 'Satellites'/ $25 per copy from R.B. Cooper, P.O. Box 330, Mangonui, Far North

Any community is made up of privately held land and public (reserved) land. For this discussion, we'll lump roadways, sidewalks, non-privately owned alleyways and pathways into 'public' land. To run your cable from point 'A' to point 'B' you will probably need to cross over or under both private and public land.

You have two options:

1) Go to each private land owner and negotiate the legal right to cross their land with your cable; then go to the public land owner (i.e., council) to do the same, or,

2) Obtain for your cable company the same legal status now held by the telephone company and the power company which allows them to cross over or under any land they wish (with some procedural limitations) without negotiating 'individual approvals'. This is what 'Network Operator Status' is all about.

Note that by becoming a 'Network Operator' you are bypassing the time consuming step-by-step process of negotiating land crossing rights with individual land owners and establishing your 'legal right' to cross over/under land. Network Operator Status (NOS)conveys no other 'rights' and this is not a license or permit to be a cable television operator. Under present New Zealand law there is no permit, no license involved in operating a cable system. This is no accident; in the rewriting of the laws during 1987-88-89 it was the deliberate intent of the law makers to free-up cable television as an industry and to make it possible for cable businesses to operate with a minimum of regulatory oversight. This situation does not exist because of a 'loophole' in the law; it is quite deliberate (even if previously little understood). NOS is designed to facilitate access to land and property necessary to maintain a network.; it is not a license and does not confer government endorsement of any particular business venture.

Is it desirable to become a Network Operator? Not always. For some (would-be) cable operators it may be possible to deal with just one or two land owners; for example, a local council. In other cases the situation is more complex with negotiations involving dozens/hundreds of landowners. The Ministry of Commerce requires that Network Operator Status (NOS) applications (2) to them demonstrate the difficulty the (would be) cable operator has encountered with particular councils, or, if there are complex negotiations that (alone) can be 'sufficient proof' of the necessity for network operator designation for the business venture.

NOS is available to a registered company; not individuals. You gain nothing with an elaborate company; a simple modest capital structure registered company is all that the Ministry of Commerce requires. The Ministry does not require that you have all of your business plans completed, nor even your funding in place, when making NOS application. When NOS is granted, it is possible to transfer the NOS if the company later changes hands but it is not possible to sell the NOS itself from company 'A' to company 'B'.

Annually, in April/May, the Ministry reviews the firms holding NOS and requests an update of their activities. The first NOS grant was made in April 1989 and Kiwi Cable Company Ltd was granted in June 1990. Firms that appear to the Ministry to not be pursuing their planned cable TV programme lose their status. NOS is good throughout New Zealand; it is not granted on a geographic-specific basis.

THE POWER UTILITY

Do you start with the Ministry of Commerce (contact **P.G. McCabe**, Senior Advisor, Telecommunications and Postal Policy, Ministry of Commerce, P.O. Box 2847, Wellington; tel: 04-472-0030; fax: 04-499-0797)? The answer is a conditional 'no' although no harm is done by talking with Mr.

(2/ There are no 'forms' to complete for NOS; each application is unique. For assistance, contact us.

McCabe.

Because something like 99% of all existing 'poles' are owned by power utilities, you start there. With the privatizing of the power industry, any semblance of a nationwide 'uniform policy' is gone. Each power company has done/is doing an individual reevaluation of its own business future; some are establishing business ventures outside of traditional power supply. Your power company might even be interested in a 'joint venture' for cable.

Your second stop should be the council that manages the affairs of the community you wish to cable. At one or both of these stops you will be presented with a new hurdle; the '**Resource Management Act**'.

Under the terms of this recent act (effective 01 October 1992), anything which can be construed to be a blight on the environment could be subject to regulation at the council level. Under the RMA every (district) council must develop its own resource management guidelines; procedures dealing with everything from the dumping of pollutants into streams to the erection of antenna towers, or, wires on poles. This is, unfortunately, an untested region at the moment. Some power companies are nervous that under new council by council rules, RMA guidelines may actually restrict them from adding to or even changing out power lines in the future. It will pay you to meet with your own (district) council planners to learn what their intentions may be, and, to plead the case that adding one new (cable TV) wire to the existing skyline may be far more friendly to the environment than encouraging individual home owners to laden their rooflines with sizable TV antennas.

The Ministry of Commerce is concerned about this possible 'quirk' in the regulations, and is monitoring the possibility that some future modification of telecommunication rules may need to accommodate the goals of the RMA. This is one 'spooky' area not yet resolved so be prepared to deal with it at your own community level.

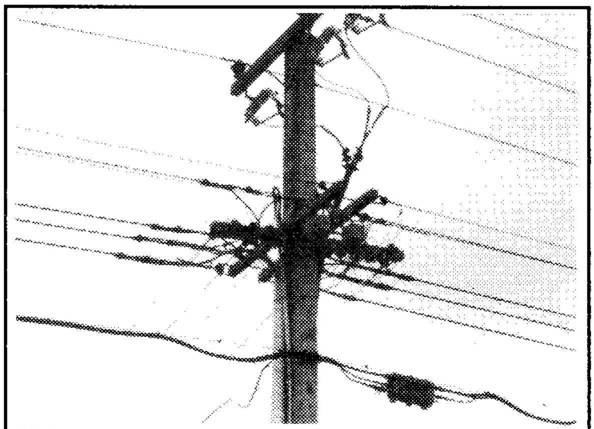
TONY GOODMAN with Kiwi Cable's 16M dish

Now, the power utility. They have poles, you want to rent or lease space on their poles. Kiwi Cable founder Tony Goodman began contacting power companies for 'permission' to use their poles for his cable TV lines in 1989. By his own estimate, he has written letters and made requests to more than 50 communities to date. However, since each application involves protracted negotiations there is a big gap between writing a letter requesting permission to use poles and actually holding a signed contract in your hand. Goodman admits to only a few of the latter.

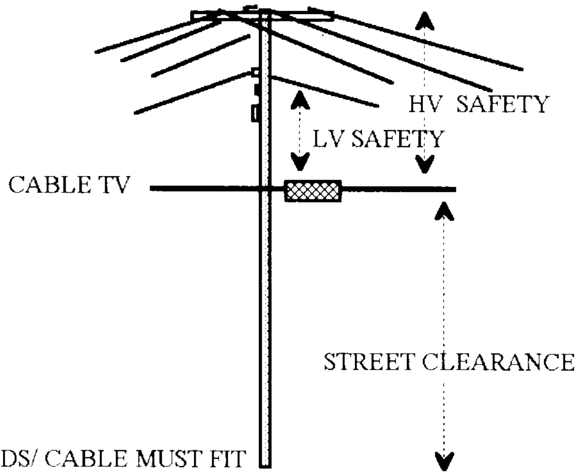
There are several factors here. The first is safety.

a) Safety of lines. A standard power utility pole averages ten metres in height, of which 8.5 to 9 metres extends above ground. At or very close to the top of the pole are the power lines. They may be HV (i.e. 13kv), EHV (far more than 13kv) or they may be 'secondary' (i.e., 400/460vac). In each case there is a regulation prescribed 'safe distance' between the power lines and the next lower set of cables. Originally, the 'next lower set' was assumed to be telephone or in urban areas traffic light signal control wires. We diagram it on the next page.

Additionally, there is a 'safe distance' between the lowest lines on the pole and the



KIWI CABLE/PARAPARAUMU COAX ON POLE

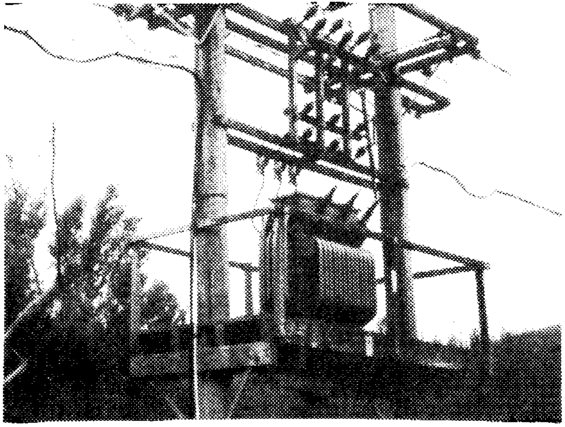


SAFETY CLEARANCES ARE SPECIFIED BY STANDARDS/ CABLE MUST FIT

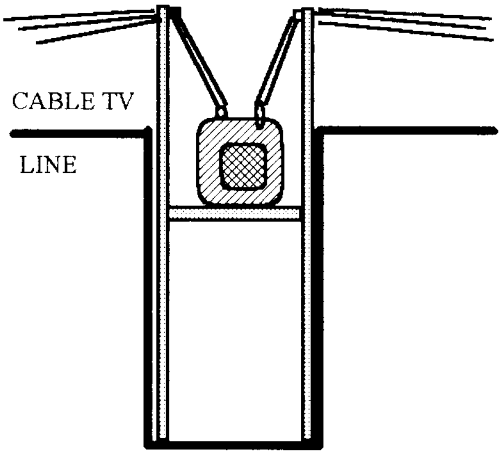
ground/street. This safe distance is designed to insure no human beings come into contact with the voltages on a pole, or, are likely in the normal course of traffic to run into the lowest wires.

Any discussions with the power utility will have to include a 'survey' of the space available on utility poles to accommodate cable TV wire(s) within the context of the safety regulations. In Paraparaumu, for example, Kiwi Cable found innovative ways to use the 'available space' without having to pay for new, taller poles (a cost the cable companies traditionally bear when required). We show one of these adaptations here.

Costs. Ideally for cable, the power utility will charge you nothing per pole per year. Realistically, the fee will fall in the range of $5 to $10 per-pole per-year. There are two accepted methods of computing pole rental fees. Civic Enterprises Ltd. (headquartered in Christchurch but as of yet not actually operating any cable systems) originally offered power companies a fixed fee 'per kilometre of cable installed'. This is a slightly controversial approach since in going from point 'A' to point 'B' with your cable you may attach to some power poles for part of the way and bury for another segment.



TO AVOID TRANSFORMER, CABLE LINE GOES DOWN POLE, UNDERGROUND, UP SECOND POLE



The more industry accepted approach is to simply agree on the annual rental per pole, count the poles in use once per year, and pay the bill when it comes. Kiwi Cable strives to stay in the region of $5 per pole per annum; other power utilities surveyed for this report believe they are entitled to $10 per pole per annum. A cable company that has a $5 per pole rate may be able to make it on $20 per home per month cable charge; and if a $10 per pole per annum rate applies, the monthly cable rate might have to be adjusted to say $21 per month. This is a negotiated rate and within reason the variance should not 'make' nor 'break' the viability of the cable company.

Kiwi Cable to date has granted to the power company a 'purchase option' wherein the power utility, within time limits specified by contract, may buy into the cable company for a fixed rate up to perhaps 20% of the cable company stock. Why do this?

If this helps the cable operator obtain a lower per pole rate, that is one possible reason. Another is that if you have the power company as an 'optional' minority partner in your cable company, you may gain other useful strengths. For one thing, the 'muscle' of the power company could one day be important in keeping someone such as Telecom (or Clear) out of your town with a competitive cable/fibre optic system. Also, during your construction (building the cable plant) phase, you'll need some specialized equipment and personnel who can handle the stringing of cables and working on/around the poles. The power utility has this equipment/people, and you may be able to strike a deal which subcontracts the labour of the plant construction back to the power utility. If the power company has a fixed-price fixed-term option on a part of your cable company stock, negotiating a fair rate for the labour subcontracting should go easier for you.

In surveying power utilities for this report, we found many are uncertain how to deal with cable TV planners. Not a few harbour the thought that cable TV might be an expansion business for their own company. If you run into this sort of roadblock, one way around it could be to offer them the same sort of minority position buy-in option as Kiwi Cable has been offering. Another way to handle this situation is to grant the power utility the 'first right of refusal' should you ever decide to sell the cable system.

Dealing with the power utility will probably be a six month to one year exercise. First you have to convince power management that you have a serious business proposal to make. To do this you will be asked a wide range of questions (to be answered in writing) including details of your construction plans, your business plan, your channel offerings. What should be a straight forward rentor/rentee agreement is unfortunately clouded at the present time by the newfound private-status of the power utilities. Once you are past management they will take your negotiated contract to their own board of directors for formal approval. You can get some assistance in all of this from Kiwi Cable's Tony Goodman (Kiwi Cable Co. Ltd., P.O. Box 354, Paraparaumu; tel: 04-297-2258, fax: 04-297-3358). Goodman and others are in the process of creating a national trade association for the cable television industry and one of the areas where they hope to assist new, would-be, cable operators is to give them practical advice on working through the power utility negotiations.

If you have a contract with the local power utility, why should you need Network Operator Status? A fair question.

NOT EVERY POLE...

Ideally in your community every place you want to string TV cable can be reached using power company poles. This is very unlikely in the real world.

When power utilities began joining Telecom in the burial of cables some ten years ago (in new subdivisions, at first; more recently in older sections of communities), one of the perceived benefits was the elimination of unsightly utility poles. Power company technology allows them to bury virtually any-voltage line they wish, but the economics of burial only work well for secondary (400/460) volt lines or customer service lines (230vac). Thus for good economic and technical reasoning, most HV and EHV lines remain in place above ground on poles.

Still, you can drive through blocks of newer subdivisions and find no visible utility poles. Obviously cable will also have to be buried in these areas and holding a contract with the power utility to rent their poles is of no value to you in such an area. Which places the cable operator back in the position of negotiating individual land-use agreements with each land owner in each block, or, obtaining NOS and dealing with the problem by being an accredited 'network operator'.

Lacking this status, your cable project could be shut down by one unreachable or unreasonable land owner. Here's what network operator status really means.

1) If you need to cross over (or under) a piece of land, you state your intention to do so (an announcement in the newspaper may suffice, spelling out the areas to be affected) ten days in advance. If someone chooses to object, you may go to a District Court to obtain (under the provisions of the Telecommunications Act of 1987; as amended December 1988) an order that reinforces your right to cross (over/under) the land in question. The order will allow you to "*enter and reenter the land at reasonable times with or without such assistants, aircraft, boats, vehicles, appliances, machinery and equipment as are reasonably necessary for the construction, erection, laying, or maintenance of any line...*"

Bottom line: With Network Operator Status, if you really need to cross a piece of land, the court will issue the necessary papers to insure that you can do so. Without NOS, you could be held up forever. Of course you are responsible for any damage you do, and when digging to bury cable must return lawns, driveways and roadways (et al) to their original condition when you have your cable(s) buried.

PROGRAMMING OWNERSHIP

There is one more law of interest to cable operators in New Zealand; the **Copyright Act 1962**. It covers who has ownership rights to television programmes, although as the Ministry of Commerce will tell you, the law is sufficiently dated that it does this very broadly.

The Ministry of Commerce believes "*that while the Broadcasting Act of 1989 does not address the question of programme access rights or the 'legal right to carry' (programmes), ... such issues are addressed in the Copyright Act 1962, although inadequately in the case of cable television in our view* **(3)**."

The Ministry goes on to say "*In the Ministry's view an anomalous situation currently exists under the Copyright Act, whereby copyright protection in the context of television applies only to material which is 'broadcast'. It is our interpretation that material which is transmitted by a (cable television) service or retransmitted from a satellite via an earth station is not afforded copyright protection.*

"*There is, in our view, no legal impediment at the present time to a cable operator receiving and distributing TV1, TV2, TV3 and TAB signals without their express permission, or receiving and distributing satellite signals originating outside New Zealand that are not subject to existing contracts within New Zealand.*"

In other words, you need no formal written letter of approval, in the Ministry's view, to place TV1, TV2, TV3 or TAB (or any other 'free to air' television service) on your cable. Nor are you required to 'pay' these 'free to air' services for their programming since, analogous

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(3/ Letter 12 March 1993 **P.G. McCabe**, Ministry of Commerce to Robert B. Cooper.

to the situation in the USA in the 1970s, your CATV system is merely 'an extension of the viewer's own antenna system'. and 'you are not charging for programming; you are charging for a master aerial service'.

A review of the 1962 Copyright Act has been underway for several years and may when rewritten alter this interpretation somewhat. The Ministry does note:

*"The Ministry ... has a concern to foster the development of efficient television markets with a minimum of regulatory control (*and*) will be watching developments in this area closely."*

When Kiwi Cable turned on their system, they did not carry TV1 nor TV2 signals; TV3 was carried from the outset. In fact, TVs 1 and 2 have only recently been added to the cable line-up. The rationale behind this is fuzzy at best; Kiwi Cable states they were concerned about TVNZ's stated (to Kiwi Cable) position that if Kiwi Cable did carry their signals without their permission (which they were withholding), Kiwi Cable would be in violation of TVNZ copyrights. At best this is a 'I said/he said' tale and we were unable to obtain TVNZ's position in this. Kiwi Cable was quite surprised to learn of our letter from the Ministry (see footnote prior page) which very clearly spells out the Ministry's position on this matter.

In the United States, cable carriage of 'local broadcast signals' has been mandatory for several decades; if you built a cable system, you were forced by regulation to carry on your cable all 'local' signals. As the available programme universe expands in New Zealand, it is not unreasonable to anticipate that Kiwi cable systems will also be required by perhaps new copyright regulation to carry local signals.

Although our correspondence exchanges with the Ministry of Commerce (again, see footnote prior page) also state that you are free to carry any *"satellite signals originating outside of New Zealand"* (as long as the programmes carried are not subject to existing contracts within New Zealand), it seems unlikely this situation will continue indefinitely. Here's the reality of the situation.

Geyserland TV, a UHF television station serving the Rotorua area, has a 7 metre dish which they use to capture programmes such as a daily Deutsche Welle (German) newscast. There are no agreements in existence between DW and any New Zealand broadcaster/cable caster so Geyserland TV is free to pluck this 30 minute programme out of the air and retransmit it to its viewers. Also on (C band) satellite at the present time are several hours per day of BBC and (British) ITN newscasts. TVNZ has an agreement with the BBC and ITN to carry these newscasts in whole (i.e.,TV2, 8AM daily; ITN World Report) or to take segmented reports out of these newscasts for use in TVNZ newscasts (6PM News, Prime Time News). These agreements effectively prevent Geyserland TV from plucking any BBC or ITN news programmes off of satellite for rebroadcast in Rotorua. Similar agreements between TVNZ/TV3 and the American ABC, CBS and NBC networks also preempt carriage of most (but perhaps not all) of these three US network programmes as available via satellite.

SKY Network TV, meanwhile, has agreements with ESPN and CNN for their programmes. The ESPN agreement is 'exclusive' to SKY and attempts to date by Kiwi Cable (and others) to remove that exclusivity have failed. CNN, on the other hand, rescinded their exclusivity with SKY after Kiwi's American owners plead to CNN's Ted Turner for personal intervention. Turner, well known for his views against exclusivity in agreements except when it benefits him decided in this case to order SKY's exclusivity 'clarified', in favour of a joint-agreement which allows Kiwi Cable as well as SKY to use CNN programmes in New Zealand; each for a different purpose.

In surveying the satellite services available other than CNN and ESPN, Kiwi Cable decided to carry the French-Pacific RFO service (approximately 10AM to 10PM daily) and something called Worldnet (approximately 20 hours daily). Both are available from C band satellite and neither charge Kiwi Cable a monthly fee. RFO is an all-French service, primarily designed for Tahiti although largely fed from Paris. Worldnet is a mixture of American PBS (Public Broadcasting System; non-commercial TV), C-SPAN (coverage of the US House of Representatives and Senate), and various news programmes on a delayed basis from American and other-source networks.

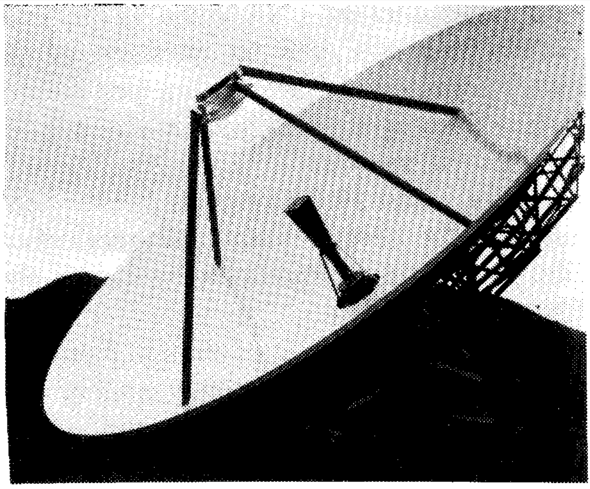
Although the Ministry believes since neither of these services is under contract in New Zealand that a cable operator would be 'free' to pickup and distribute these programmes at will, Kiwi Cable has taken the position that it is better protected if it obtains permission for these two services. This turns out to be an exercise in patience but not an expensive task.

For Worldnet you go to the United States Foreign Commercial Service desk at the US Consulate/Embassy (Auckland: 09-303-2038) and ask them to assist you in obtaining written permission from the (United States) Worldnet Satellite Television Service to carry it on your cable system. They don't do this every day so be prepared for some long delays; eventually you should receive your letter of authorisation.

For RFO, contact The French Consulate (Wellington: 04-472-0200) for assistance. You seek permission, in writing, to carry on your (proposed) cable system programming from RFO/Tahiti via satellite. They may tell you that they can*not* assist you. Kiwi Cable learned, by being persistent, that eventually you can have a letter for your files which reads something like:

> "*While we do not grant permission to carry our satellite service on your cable system, we have no objection at this time to your doing so...*"

Are there other New Zealand available programmes on satellite, today? Yes, from time to time (especially on weekends in the 4PM to midnight local period) cable services such as 'Comedy Central' (a comedy channel) and others are available. The bottom line is that under present New Zealand Copyright Law, if no one in New Zealand has the programme or programming service under contract, you are free to carry the programming on your cable system without written permission.



KIWI CABLE'S 10M DISH/ RFO, Worldnet, CNN

And taped programming?

In our example 12-channel plan, you are carrying two channels which arrive 'on tape'. Kiwi Cable's Tony Goodman and American owner Todd Klindworth advise that cable networks they are acquiring use-rights for in North America and bringing here on (VHS) tape are available to other Kiwi cable operators on a bicycle-tape basis if you are willing to share with them the costs of bringing the programmes here. Goodman believes that one of the areas in which the being-formed New Zealand Cable Television Association (NZCTA) will perform is in arranging 'networking' of programming such as this. In your cable system you have one or more dedicated VHS machines for each taped-channel service. The tapes arrive from the cable operator ahead of you on the list and you load them into your machine(s). With a small amount of automation, networks such as Country Music Television (CMTV) and MuchMusic then play through your system to viewers at home. Both of these two are presently carried by Kiwi Cable.

Programming that has no 'timeliness', such as these two music channels, can be handled more economically on tape (for now) than via satellite. Kiwi Cable is adding additional new services 'on tape' during 1994 and it is likely that even with greatly expanded satellite services in 1994/1995 programming brought in from American and European sources on tape will play an increasingly important part in new Kiwi cable operations. When digital taping techniques (using compressed video) arrives in 1996, the quality of this programming as well as the flexibility of the playback equipment will improve dramatically.

In this scenario, Kiwi Cable acts as the licensee, pays the licensing fees which you share when you use the taped programming, and proposes through the NZCTA to allow the distribution of this programming to other communities.

What about SKY channels? A very special situation; see box material here.

NETWORKING

On paper at least each CATV system 'stands alone'; an entity to itself. Unlike terrestrial broadcast networks which inter-tie one to another through BCL/Telecom microwave links, there is no economical system at present to allow the exchange of programming 'in real time' between systems.

In other portions of the world, cable companies are allowed by regulatory agencies to own and operate private microwave facilities. These are used in three ways:

1) Remote headends / It is not always feasible to obtain clean, high quality terrestrial broadcast signal reception from a tower (headend) location close to your cable community. In this instance a cable 'sub-headend' may be located 15-50km from the community to pickup off-air broadcast signals and bring them back to the community via microwave. Civic Enterprises' proposed PacSat cable system for Greymouth plans to do just that by taking Christchurch TV3 off air at a 'knife edge refraction' receiving site in Hokitika and then relaying it

THE SKY NETWORK ENIGMA

In theory, Sky would welcome cable operators in lightly populated (or terrain-disadvantaged) areas with open arms. In fact, SKY refuses to grant cable systems permission to carry their signals citing 'an arrangement with Telecom to deliver cable programming into homes via the Telecom network' as their reason for not courting cable. While no known existing or on-the-horizon Telecom technology will make it possible for SKY/Telecom to deliver multiple channels of high quality television into rural-region homes via 'copper telephone wires', SKY persists with this official corporate line.

SKY's ownership, spread between two American cable giants (TCI, Time-Warner), two American telephone companies (Ameritech and Bell-Atlantic) and local owners (TVNZ et al) makes corporate policy difficult to focus-upon since each of SKY's owners has its own agenda here and elsewhere in the world. TVNZ, for example, is partnering with TCI to create an Asian Business News Channel, out of Singapore, via satellite in 1994.

SKY's top personnel, Americans, are ex-cable TV and understand the basics of the industry well. In discussions, there is an underlying tone of some concern on their part that cable will gain a foothold in New Zealand and reduce their own penetration. So where there could be a happy marriage with cable entrepreneurs who might extend SKY coverage into tens of thousands of new rural-area homes at no direct capital expense to SKY, there is a total disinterest from SKY. By refusing cable operators permission to carry their signals, SKY has also caused letters of protest to be filed with the Ministry of Commerce raising questions as to SKY's 'legal right' to refuse granting carriage to New Zealand cable firms. The Ministry is not certain how to proceed on this matter but a study is being discussed. In the meantime, SKY has every right to be nervous as new cable programme sources appear on new satellites in 1994; sources which cable firms could turn to in lieu of being able to do business with SKY at all.

back to Greymouth using recently applied for 12.75-13.25 GHz microwave.

2) Trunk Line Replacements/ Often a central or core community can expand to neighboring communities by using broadband microwave as a replacement for coaxial trunk lines. Assume you have a town of 5,000 separated by 20km from a town of 2,000. The town of 5,000 has cable first for all of the obvious reasons. To expand into the smaller town would require expensive coaxial cable trunking between the two communities; often the cost is greater than the smaller town can 'afford' in terms of your likely return on the investment. By taking all (12 in our example) cable signals from the 5,000 people town and shooting these signals across the countryside to a small microwave dish at the second town, you can then begin wiring the second town without **(a)** a long, expensive trunking system, or, **(b)** a new headend for the second town. Under trade names such as 'AML' (amplitude modulated link; Hughes Electronics) this service makes expansion to neighboring communities often far more affordable than other techniques.

3) Interconnect Programming Exchange/ In regions where most towns have cable, privately owned cable microwave allows programming originating in one community (coverage of a local Rugby match, for example) to be shared with other neighboring communities. This is usually a single or two channel service designed to interconnect towns that share a common 'market sense' but which are far enough apart that cable could not connect them.

While it is possible for cable to go BCL or even Telecom for such relay services, quotes obtained to date show they either do not understand the proposal or want to gold-plate their desks with the charges. Realistically, neither BCL nor Telecom to date have shown even the slightest interest in the real world of cable TV linking.

One would-be cable firm, Civic Enterprises Ltd., has asked the Ministry of Commerce for approval to establish microwave links in the 12.75-13.25 GHz region. The reason for this frequency range selection is the ready availability of equipment, and, price. US manufacturer Hughes has been building 'AML' equipment in this spectrum region for more than a decade and now much of the original equipment is on the market through US refurbishers for around NZ$7,000 per 'station'. With a pair of stations you can transmit and receive over a path of up to 40km more than 12 simultaneous TV channels. The economics are that with it costing us an estimated $7,335 per kilometre for our cable plant, for approximately NZ$14,000 we could cover 40km of distance; a savings of $132,700 (!) over typical cabling costs. The Ministry has suggested approval for the plan although Civic Enterprises' proposed area of application (Greymouth) is not yet ready for the installation. You could discuss this further with Ian Hutchings at the Ministry of Commerce (tel: 04-472-0030; fax: 04-473-2489; P.O. Box 2847, Wellington).

WHAT ABOUT FIBRE OPTICS?

Some would have you believe coaxial cable is yesterday's technology; fibre optic ('cable') is the coming thing. Here's the status of fibre optics today (for a complete review see **Coop's Technology Digest** September 1993).

1) Fibre optic distribution offers considerably more bandwidth than coaxial cable.

2) Fibre optic is, in theory, easier to manipulate into a two-way system than coaxial cable.

3) It will (one day) be far easier to 'combine' telephone, data transmission and television (in any form whether compressed digital or traditional analogue) on fibre than it is today on coaxial cable.

Those are the pluses favouring fibre. And the negatives.

1) While the fibre cable technology is at least in its third generation of development (now nearing 3 decades in technology-age), the interfacing electronics that allows information to be plugged into fibre cable, or taken out of fibre cable, is at best in its second generation. This

interfacing hardware remains expensive and not totally suited to basic distribution of television programming.

2) Basic fibre optic 'plant design' is a still very fluid, developing technology. A system designed and built in 1994 runs the very real risk of being technology-outmoded by as soon as 2000. This could prove very expensive for a pioneer in the technology.

3) While any skill can be learned, the handling/installation/daily use of fibre optic cables in no way resembles the same functions with coaxial cable. There is a massive, perhaps expensive, learning curve ahead for anyone who pioneers the wiring of a community with fibre optic cable in New Zealand. Telecom with all of its expertise and resources has learned that in New Lynn and Pakuranga; a most expensive lesson at that.

In terms of dollars invested versus dollars hopefully to be earned, for the foreseeable future coaxial cable offers far more bandwidth capacity in New Zealand than is likely to be used. This is true if all signals remain analogue in content; when (not if) the transmission format becomes digital compressed video rather than analogue (see **Coop's Technology Digest** for August 1993), the 'capacity' of the available bandwidth measured in terms of number-of-video-channels available will multiply by a factor of at least 4. All of this suggests that while fibre optics may be the coming thing, New Zealand communities needing basic cable TV service do not require it.

TELECOM/Pakuranga installing fibre optic 'cable'

Kiwi Cable's American managing director Todd Klindworth is convinced he should be placing fibre optic cables on poles, along with the coaxial cable, as he expands his Kapiti Coast region cable service. Klindworth believes that while you are incurring the costs of construction, the 'slight additional cost' to install fibre optic cable on the poles is not significant (in the area of $1-2 additional, per metre, in place). Once in place, he'll simply 'warehouse it'; ready to go into service when the demand develops. This represents the 'other view' on fibre optic cable and TV distribution today.

To use (or not use) fibre optic will be a business judgment each new cable operator faces. It is also a matter of philosophy. Kiwi's Klindworth thinks of his company as a '*communications company*'; cable TV is but one aspect of what he one day hopes to offer. Civic Enterprises' John Rutherford shares that view talking of being a 'telephone company in competition to Telecom'. What you might do in a smallish New Zealand community with terrain-blocked TV reception is a decision only you can make.

THE MATTER OF EQUIPMENT

Almost every manufacturer of cable TV equipment now considers the industry to be a 'world market'. Channellized (i.e., headend) equipment is equally available in PAL-B or G as it is in NTSC (or even SECAM). The premium pricing for PAL format equipment is either very low or not at all. There is one problem unique to New Zealand TV.

Channel 1.

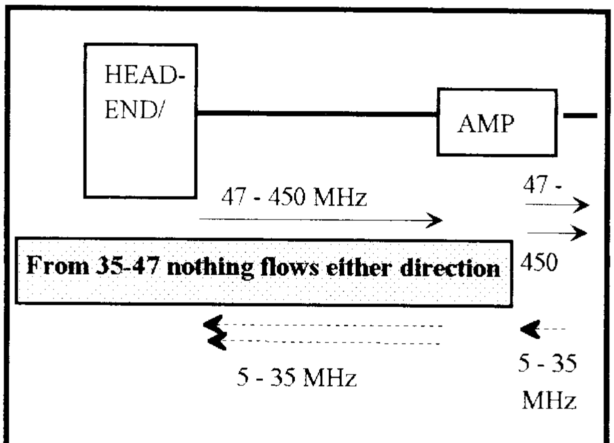
New Zealand channel 1 is 3 megahertz lower in frequency than any other TV channel in the world; 45.25 MHz versus 48.25 MHz. Yes, Australia has a channel 0 but that is being phased out and Australia does not have cable TV.

Cable plant (line/repeater) amplifiers are designed to pass or amplify the range of frequencies which matches local TV channelling. In North America, where NTSC channel 2 is the lowest channel in the spectrum, the lower edge of amplifier bandpass (i.e., lowest frequency passed by the amplifiers) is 54 MHz. European/Asian amplifiers go down to 47 MHz to accommodate TV transmitters operating on 48.25 MHz. Nobody goes down to 45 MHz.

The extra two megahertz may not seem like much; "*simply retune the amplifiers*" sounds like a fast answer. Unfortunately the problem is complicated by amplifiers having the ability to pass, backwards, a return or two-way band. Worldwide, this is traditionally 5-30/35 MHz. Between the signals going in the forward direction (from headend to the subscribers), or from 47 / 54 MHz upwards, and, the signals going in the reverse direction (from 5-30/35 MHz) that must be a buffer or crossover frequency range where nothing goes in either direction. Given the nature of filters to accomplish this two-way on the same cable 'trick', squeezing 'just another 2 MHz out of the forward direction' is a major design headache.

Bottom line? With New Zealand being the only country in the world 'so foolish as to be using such a low frequency for TV', we are not going to find much interest in redesigning world-standard amplifiers to solve our problem.

This means cable carriage on New Zealand TV channel 1 is both impractical (with present equipment designs) and a problem for New Zealand system designers who would like to take TV1 (or 2 or 3) directly off the air on channel 1 and carry it on the cable on its original frequency. The answer is that while you may receive channel 1 off the air, you will carry it on some other cable frequency. This also means that older TV sets (those not having varactor type tuners) may 'lose' a channel of coverage. We'll return to this non-problem in part two (January 1994).



TWO - WAY SYSTEM / forward passband is separated from return passband (5 - 35) in amplifiers

One of the design attributes of a cable system is that unlike off-air transmission, you can stack adjacent channels (such as 4 and 5 and 6 and 7 etc.) on the cable. You could not do this off the air since lower sideband signals and uneven signal levels would make reception very difficult for the average TV set. Cable gets around all of this by doing improved filtering on all signals (further reducing the lower sideband signal), and, by assuring the signal strength of each adjacent channel is very uniform. If channel 4 measures +61 dBuV at the subscriber's set, channel 5 will measure the same as will channel 6 as will channel 9 and so on. A television set, if all signals are quite equal, can handle adjacent channels just fine. It is only when the signal levels are uneven that adjacent channel reception becomes a problem. This is one of the reasons cable manages so many TV channels in a given bandwidth; adjacent channels are not taboo.

We'll look at this with greater depth in part-two of this series in the next issue of Tech Bulletin.

CAN I MAKE MONEY?

Cable TV has been considered a 'cash cow industry' for several decades. While building a cable system is capital intensive (big money, up front), cable's accurately predictable income stream and the small chance of outright uncorrectable failure make it an attractive investment opportunity. New Zealand bankers may require five to ten years to convince of this, especially in small towns, but the cable plant builder will find financing is possible through private investors or even overseas agencies that understand cable.

A cable system designed to make money is a low risk venture; assuming only there is a need for the service in the first place. You determine 'need' by being certain your cable programming channels will be more attractive than the alternative; rooftop aerial reception.

A community with no rooftop aerial reception is the least risky even if cable offers only TVs 1-3. In this 'dream' situation, it is cable or nothing. With more than 1,050 TV transmitters and translators in New Zealand, such communities exist only at the very-small end of the scale (fewer than 50 homes). Logically, every channel possible on a rooftop aerial reduces the likely cable 'penetration' level. A subset of this is the difference between 'available' and 'quality reception'. A community where typical home aerial signals measure in the 45 dBuV region and down or where reception is marred by heavy ghosting (a combination that exists in many suburbs of Wellington, for example) is a candidate because the cable operator can properly site his antennas and install electronics to produce 'studio quality' where previously fringe-quality existed.

Combinations of this are endless; TV1 is high quality (TASO 1), TV2 is medium quality (TASO 3) and TV3 is poor (TASO 4). Or as will be the case in many communities, TVs 1-3 all are TASO 2 or better and in this case it will be the 'additional channels' available exclusively on cable which will sell the service. In each variation, world experience teaches us the cable 'penetration' (percentage of homes taking the service) will vary primarily during the initial 3 year 'startup' period and the cable system with higher penetration in the early years will be where rooftop aerial reception is not high quality. Experience also teaches us that as long as the cable company manages to offer from 2 to 3 times as many programme channels as the rooftop alternative, between 3 and 5 years of cable operation will find the penetration rates merging; i.e., communities with even quality rooftop reception will catch up with communities that began with poor rooftop aerial reception. By the end of the 5th year both systems should be about even in the 'penetration race'.

INTERNATIONAL $$ AVAILABLE

While cable's business-worthiness could be a difficult 'sell' to conservative New Zealand bankers, foreign capital sources are anxious to invest. At the World Economic Development Congress (September in Washington, DC) international cable leaders showed unusual enthusiasm for investing cable profits from developed countries (Europe, North America) into non-cable-developed areas. **Jeffrey Schwall**, president of International Time Warner Cable, told the group *"There are tremendous opportunities but you must consider language, customs, government support, foreign ownership rules and competing technologies before investing in a certain country."*

The appearance of UHF channels effects the success of the cable only if the UHF broadcasters offer viable, competitive programming; something which the cable operator has little control over. Uninteresting programming attracts few viewers; vertical interest programming (such as the race coverage of TAB) attracts intensely loyal viewers but not a large number of them. A UHF channel suffers in two ways:

1) It is more difficult for the average viewer to receive properly (something cable can correct), and,

2) By being a 'smaller' operation, it has fewer dollars with which to produce or purchase programming. This is a vicious 'Catch 22'; the station operates fewer hours per day and when operating has programming which is less appealing. Thus programming attracts fewer viewers, which attracts fewer advertisers who spend less money. By having fewer advertisers

spending less money, the station has fewer dollars with which to purchase programming. By having fewer programmes, it transmits less per day ... and the cycle continues.

UHF began in North America in 1953. It was not until the late 1970s (25 years after UHF began) that UHF began to be a profitable broadcasting business and it is questionable this would have happened had it not been for cable giving UHF stations far better coverage than they were able to achieve on their own.

New Zealand's new commercial UHF (this does not include SKY pay-to-view) will run through this cycle for perhaps a decade or more. A cable operator in a fringe TV reception area will have to weigh the subscriber appeal of the New Zealand UHF station(s) against the appeal of satellite delivered all sports, all movies, all children's, all religion (etc.) channels. A UHF channel operating 7 hours per day versus a satellite channel operating 24 hours per day on your cable will impact how successful your cable business becomes.

We'll leave you for part-one of this two-parter with these statistics:

1) The 'typical' cable TV system will return an amount equal to its original capital cost between month 60 and month 72, after all interim operating costs.

2) The 'typical' cable TV system, having selected a suitable 'mix' of programme channels to offer on cable, will reach 50% penetration of homes between month 36 and 60.

3) The 'typical' cable TV system has cash flow (i.e., money left over at the end of the day/month/year) equal to between 29 and 64% of gross receipts after it reaches the 50% penetration point.

4) The 'typical' cable TV system has an 'asset value' for liquidation based less on its investment or its cost of replacement than on its 'cash flow'. At any point after the system is installed and operating, the system can be sold for what amounts to a 'capital gain' profit. Because no systems have yet sold in New Zealand we cannot refer to historical numbers here. But, based upon cable TV system selling prices elsewhere in the world, the sale-value of a cable TV system will average upwards of six (6) times the system's annual cash flow to as much as (thirteen) 13 times cash flow.

Tables here show the numbers for our 'example' system serving a small community of 500 potential subscribing homes. Just for illustration, see that at the end of five years:

1) The cable company has an annual gross of $79,140; of which:

a) $41,654 is gross profit (i.e. after operating expenses).

2) With 337 subscribers, at 6 times (6X) cash flow, the system would have a market value of $249,924 (or more if for system reasons it is worth more than 6X cash flow).

3) At that point (60 months of operation) the system would have an accumulated cash flow of $110,754. When you add this cash flow to the sale price of $249,924, the original $175,000 investment has at the end of 60 months become $360,678.If the same $175,000 was invested in a 10% interest bearing account at the end of 60 months it would be worth $281,839. The 'extra' $78,839 earned by the cable system investment is the reason why cable is an attractive business opportunity.

At the end of ten years, the same $175,000 investment at 110% per annum would have become $453,904; in our example cable system it becomes $667,058 (cash flow of $361,958 plus system value of $305,100) or ($)213,154 'good reasons' why cable attracts ten year investment money.

TO BE CONTINUED-

This two-part study of cable television business opportunities in New Zealand will conclude in our issue 9401; January 1994. To be certain of receiving part-two, renew your **Tech Bulletin** subscription for 1994 before 01 January.

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EXAMPLE 500 POTENTIAL SYSTEM / 10 YEAR CASH FLOW SUMMARY

YEAR	GROSS	OP.COST	GR.PROFIT	DEPREC.	TAX.NET	CUM NET	CUM C/F
1	$29,600	$29,050	$550	-$17,500	-$16,950	-$16,950	+$550
2	$42,000	$30,510	$11,490	-$17,500	-$6,010	-$22,960	+$12,040
3	$56,400	$33,390	$23,010	-$17,500	+$5,510	-$17,450	+$35,050
4	$70,590	$36.090	$34,050	-$17,500	+$16,550	-$900	+$69,100
5	$79,140	$37,486	$41,654	-$17,500	+$24,154	+$23,254	+$110,754
6	$86,440	$38,850	$47,590	-$17,500	+$30,090	+$53,344	+$158,344
7	$90,240	$39,326	$50,914	-$17,500	+$33,414	+$86,758	+$209,258
8	$90,000	$39,150	$50,850	-$17,500	+$33,350	+$120,108	+$260,108
9	$90,000	$39,150	$50,850	-$17,500	+$33,350	+$153,458	+$310,958
10	$90,000	$39,150	$50,850	-$17,500	+$33,350	+$186,700	+$361,958

In example system, system growth 'flattens' at 75% penetration (year 7). **GR**(oss) **PROFIT** is receipts less **OP**erating **COST**s. **DEPREC**iation is based upon simplistic 1/10th of original investment per year over 10 years and is used in calculating **TAX NET** (tax base) with early years (1,2) 'losses' carried forward so tax is due starting in year 5 (**CUM NET**).**CUM** Cash/Flow is actual cash remaining after expenses, before taxes.

HOW MUCH IS MY CABLE SYSTEM WORTH?

YEAR	INVESTED DOLLARS	RETURN AT 110% CD	CABLE SUBS	CASH FLOW VALUE/6X	PER SUB VALUE
1	$175,000	$192,500	130	$3,300	$163,895
2	$192,500	$211,750	190	$68,940	$211,359
3	$211,750	$232,925	250	$138,060	$241,022
4	$232,925	$256,218	307	$204,300	$250,441
5	$256,218	$281,839	337	$249,924	$249,924
6	$281,839	$310,023	367	$285,540	$244,954
7	$310,023	$341,025	375	$305,484	$222,482
8	$341,025	$375,128	375	$305,100	$194,672
9	$375,128	$412,640	375	$305,100	$194,672
10	$412,640	$453,904	375	$305,100	$194,672

By starting with $175,000 and two options: **(a)** placing with secured CD programme offering 10% interest (where you leave principal + interest for ten years), or, **(b)** building the example cable system. **Cable Subs** from prior tables. **Cash Flow Value/6X** from prior tables times '6'. **Per Sub Value** based upon 1993 economic studies of similar cable systems in 'middle countries'. As system subscribers grow, value at 6X cash flow overtakes value on per-sub basis (year 5). While CD investment 'looks' better, to either of two right hand columns add 'CUM CF' from table above; i.e., year 5 returns $249,924 plus $110,754 cash flow; $360,678.

ASK COOP

Robert B. Cooper began a professional career in weak signal TV reception in 1956 when U.S. magazine **RADIO ELECTRONICS** engaged him to prepare a regular feature column on this subject. Creator of 15 books and more than 2,200 magazine articles, 'Coop' is now a resident of New Zealand's Far North where he continues to research and write.

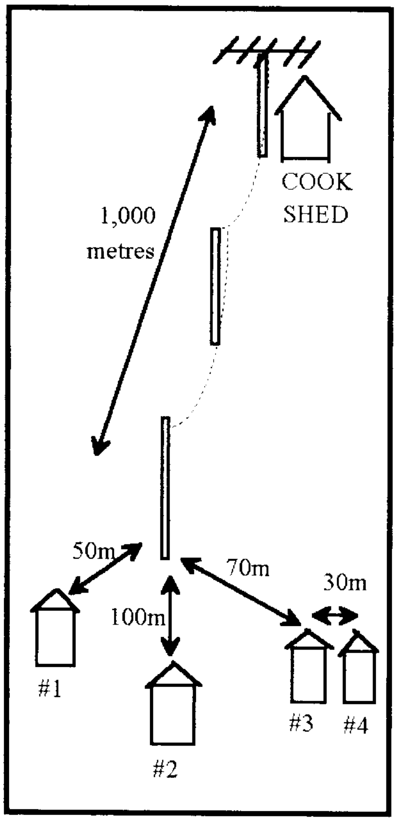
LONG CABLE RUNS

"Using data from Tech Bulletin 9303 I was able to solve a customer situation with two homes separated by 400 metres from a hilltop where adequate reception was found. By placing a high gain masthead at the top with the power supply and two-way splitter at the bottom, we produced excellent looking pictures. Now I have a situation with four homes at the bottom of a hill which will require 1,000 metres of cable to reach from the hilltop to the base; then within 100 additional metres are each of the homes. There is mains power at the top of the hill if that helps. The channel 6, 8 and 10 signals at the top are in the TASO 1-2 region."

Jason Clough
Wairoa

The only significant difference between your successful 400m run and the new one is line length which means additional cable loss (signal attenuation). Cable loss is usually offset with increased amplifier gain or more amplifiers. This is the basic technical premise behind this issue's Cable TV feature.

Ideally, each TV set will have 0 dBmV/+60 dBuV at the antenna terminals on all 3 channels. We have sketched your system as shown here to visualize where the losses will be. With TASO 1-2 signals at the top of the hill, we'll assume worst case and suggest the signal levels if measured would be -6 dBmV/+54 dBuV; only 6 dB 'shy' of the ideal set level. Between the hilltop signals and the four TV sets at the bottom is 1,000 metres of attenuation (cable), a 4-way splitter (more attenuation), and then up to 100 metres of final leg cable (still more attenuation).



The solution is shown below. Using 7-Foam series would be less expensive but losses in 1000m are 15 dB greater than Foam 11 and as you can see (levels along left hand edge, below) we 'just make it' with Foam 11 losses. The top (*) masthead is a **Nippon Antenna Co.** model W-5000; 46 dB gain max (taken back to 44 dB gain with gain control) on band III. Power for this is at the Cook Shed. At 613m down the hill, install an identical W-5000; input level should be +60 dBuV and set gain for output of +104 dBuV. The amp will handle +114 out so the safety margin is good. Then through last 387m of Foam 11 to a 4-way splitter at bottom of hill. This MUST be a power-pass/one-leg ONLY 4-way (such as **Maspro** 4SPFN), outdoor. The operating power for #2 W-5000 comes via the power passing leg from one of the homes (#1 shown). Each home gets +60 - 63 dBuV and you get paid heaps for doing a good job! W-5000 from **Signal Master** (09-525-5599).